Journal of Physics: Conference Series 2011 vol.324 N1

Spin relaxation in Kondo lattices

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Abstract

A model of spin relaxation in Kondo lattices is proposed to explain the presence of an electron spin resonance (ESR) signal in the heavy fermion compounds Yb 2Rh 2Si 2 and Yb 2Ir 2Si 2. Coupled equations for dynamical susceptibilities of Kondo ions and conduction electrons are derived by means of the functional derivative method. The perturbational scaling approach reveals the collective spin motion of Yb-ions with conduction electrons in the bottleneck regime. A common energy scale due to the Kondo effect regulates the temperature dependence of the different kinetic coefficients and results in a mutual cancelation of all divergent parts in a collective spin mode. The angular dependence of the ESR linewidth is shown to be in a qualitative agreement with experimental data on Yb 2Rh 2Si 2 and Yb 2Ir 2Si 2. Linewidth contributions other than the Kondo interaction are also discussed.

http://dx.doi.org/10.1088/1742-6596/324/1/012017